

REMARKS

Claims 11-21 are pending and under consideration. Reconsideration is requested based on the following remarks.

Interview Summary

The Applicants submit the following summary of the telephone interview that took place April 17, 2006 between the undersigned representative of the Applicants and the Examiner.

Telephone Conference:

The Applicant thanks the Examiner for the many courtesies extended to the undersigned representative of the Applicant during the telephone interview that took place April 17, 2006.

Among the issues discussed was the amendment filed January 13, 2006, which crossed the Office Action mailed January 17, 2006 in the mail. The Examiner graciously expressed a willingness to see why the amendment mailed January 13, 2006 has yet to be forwarded to him for action. Still, in the interest of avoiding unnecessary fees for extensions of time, the Applicants are resubmitting the arguments made in the amendment filed January 13, 2006 herein.

Objections to the Drawings:

The drawings were objected to for not showing every feature recited in the claims. The Office Action, however, cited no features not shown in the drawings that were recited in the claims. The Applicants believe that every feature recited in the claims is shown substantially in the drawings, to the extent required by persons of skill in the art to understand them. The Applicants request respectfully further clarification as to any specific instances of claimed features not being represented in the drawings. In the alternative, withdrawal of the objections to the drawings is earnestly solicited.

Claim Rejections - 35 U.S.C. § 103:

Claims 11-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,271,600 to Philofsky et al. (hereinafter "Philofsky") in view of U.S. Patent No. 6,087,744 to Glauning et al. (hereinafter "Glauning"). The rejection is traversed. Reconsideration is earnestly solicited.

Claim 11 recites:

A refrigeration unit.

Neither Philofsky nor Glauning teach, disclose, or suggest, "a refrigeration unit," as recited in claim 11. Philofsky, rather, relies on blower 33 to circulate gas within the housing and ducts, as described at column 3, lines 39, 40, and 41, and as shown in Fig. 1. Cooler 56 is a cooler, as described at column 4, lines 8-14, not a refrigeration unit, contrary to the implication in the Office Action. Cooler 56 may be seen clearly in Fig. 1, in fact, to be a parallel flow heat exchanger, not a "refrigeration unit," as recited in claim 11, at all.

Glauning, for its part, circulates fluid through a radiator, not "a refrigeration unit," as recited in claim 11. In particular, as described in Glauning at column 2, line 67, continuing at column 3, lines 1-5:

The Figure schematically shows an internal combustion engine 100, a radiator 101, and two conduits 102, 103 for feeding fluid from the engine 100 in the radiator 101 and back again. Cooling fluid for the electrical machine 1 is tapped from the conduit 103 by a tube 104 and fed back to a pump 106 by a tube 105.

Thus, even if Philofsky and Glauning were combined, as proposed in the Office Action, the claimed invention would not result.

Claim 11 recites further:

A closed line system, thermally coupling said refrigeration unit to the parts of said stator to be cooled.

Since neither Philofsky nor Glauning show "a refrigeration unit," as discussed above, neither Philofsky nor Glauning can teach, disclose, or suggest, "a closed line system, thermally coupling said refrigeration unit to the parts of said stator to be cooled," as recited in claim 11, either. Thus, even if Philofsky and Glauning were combined, as proposed in the Office Action, the claimed invention would not result.

Claim 11 recites further:

Discrete coolant areas associated with the parts of said stator to be cooled.

Neither Philofsky nor Glauning teach, disclose, or suggest, "discrete coolant areas associated with the parts of said stator to be cooled," as recited in claim 11. Philofsky, rather, teaches away from discrete cooling areas at column 1, lines 43-47, where he describes connecting an individual, i.e. discrete vent tube to each coil as "prohibitive in view of the large number of coils and tubes in each machine, which would require over 1500 connections for a typical machine."

Similarly, in Glauning, a cooling jacket 40, rather than "discrete coolant areas associated

with the parts of said stator to be cooled,” as recited in claim 11, surrounds the stator 34, as described at column 3, lines 12 and 13. Thus, even if Philofsky and Glauning were combined, as proposed in the Office Action, the claimed invention would not result.

The Office Action acknowledges graciously at page 4 that Philofsky shows no “coolant is circulated by a thermosiphon effect,” as recited in claim 11. The Office Action seeks to compensate for this deficiency of Philofsky by combining Philofsky with Glauning, saying at page 4 that:

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to replace the circulation pump of Philofsky, US3271600 with a thermosiphon. One of ordinary skill in the art would have been motivated to do this so that no separate pump is needed.

A thermosiphon, however, isn't the only deficiency of Philofsky with respect to claim 11. Philofsky, rather, also lacks a refrigeration unit, as discussed above. Philofsky, in particular, relies on external pump or compressor 55 to circulate coolant through cooler 56, as described at column 4, lines 8-12. To circulate coolant by a thermosiphon effect, on the other hand, requires a thermal gradient, something cooler 56, a parallel flow heat exchanger, cannot provide, at least after you dispense with the pump. Thus, modifying Philofsky as proposed in the Office Action will render the reference unsuitable for its intended purpose of cooling a stator, as well as inoperable, in contravention of M.P.E.P. § 2143.01. Philofsky will simply not run without a pump.

Finally, claim 11 recites:

Coolant being heated or at least partially vaporized in the discrete coolant areas.

Since neither Philofsky nor Glauning show, “discrete coolant areas,” as discussed above, neither Philofsky nor Glauning can teach, disclose, or suggest, “coolant being heated or at least partially vaporized in the discrete coolant areas,” as recited in claim 11, either. Thus, even if Philofsky and Glauning were combined, as proposed in the Office Action, the claimed invention would not result. Claim 11 is submitted to be allowable. Withdrawal of the rejection of claim 11 is earnestly solicited.

Claims 12-20 depend from claim 11 and add additional distinguishing elements. Claims 12-20 are thus also submitted to be allowable. Withdrawal of the rejection of claims 12-20 is earnestly solicited.

Claim 21:

Claim 21 recites:

A refrigeration unit.

None of the cited references teach, disclose, or suggest, "a refrigeration unit."

Claim 21 recites further:

A closed line system, thermally coupling said refrigeration unit to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled, and in which a coolant is circulated by a thermosiphon effect with boiling and vaporization, the coolant being heated or at least partially vaporized in the discrete coolant areas.

In the claimed invention, no pump is used and circulation is performed exclusively by boiling and evaporation, i.e. a thermosiphon, as described in the specification of record at, inter alia paragraphs [0010] and [0030].

Although a thermosiphon is mentioned in Glauning, the coolant flow to which it pertains circulates in coolant passages 28 and 38, which run to a substantially cylindrical coolant jacket 40 connected with an inner surface 45 of a substantially cylindrical housing 36. In particular, as described at column 3, lines 13-21:

The cooling jacket 4 which is substantially cylindrical is connected with an inner surface 45 of a substantially cylindrical housing 36. The cooling jacket 40 has one or several ring-shaped or meander-shaped grooves which operate as cooling passages 38. Due to the resulting great contacting surface of the cooling jacket 40 with the housing 30, a good heat transfer from the stator 34 to the cooling jacket 40 and thereby to the housing 36 is guaranteed.

The stator winding of Glauning is cooled virtually exclusively by air, providing, at best, an indirect removal of heat from the stator 34. In particular, as described at column 4, lines 27-42:

The air which is located in the supply chamber 54 is further guided through several openings 14 or a longitudinal slots 15, which guide the air in direction of an air gap between the rotor 44 and the stator 34. The air passes over the winding head 10 at the drive side and can take the heat. Simultaneously, it is cooled by passing over the water-cooled housing 46, before it is guided through the air gap between the rotor 44 and the stator 34, as well as through the claw pole 46 and an excitation winding 16 toward the winding head 18. Therefore the above mentioned elements are cooled.

When the air passes the water-cooled housing 36, it takes the heat with it and is cooled. The air can flow out from the electrical machine 1 through several openings 22 or longitudinal slots 23 arranged at the end side of the housing 36. A part of the flowing out air is again aspirated through the opening 2 as a fresh air. Thereby a partially closed circulation is produced.

In the claimed invention, on the other hand, the stator winding is cooled directly by coolant which circulates in the closed piping system using the thermosiphon effect. This allows the heat to be

removed directly from the stator winding, *where it originates*. This is described in the present specification of record at, inter alia paragraphs [0011], [0013], and [0017].

Finally, since, as recited in claim 21, "coolant is circulated by a thermosiphon effect with boiling and vaporization," a two-phase coolant is used. This allows relatively small cross sections in separate tubes, especially in the area of the stator, to take advantage of the evaporation enthalpy of the coolant. Claim 21 is believed to be allowable.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all of claims 11-21 are allowable over the cited references. There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

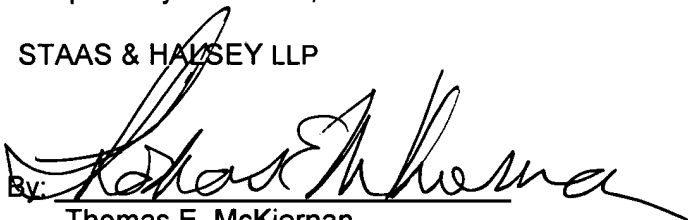
Respectfully submitted,

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